FOR DISCUSSION

ONTARIO MINISTRY OF SKILLS DEVELOPMENT

ASSESSMENT OF OCCUPATIONAL SHORTAGES IN ONTARIO'S MANUFACTURING AND CONSTRUCTION INDUSTRIES

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MINISTRY OF SKILLS DEVELOPMENT

LABOUR MARKET RESEARCH

FALL, 1987

Ministry of Skills Development
The Honourable Alvin Curling
Minister

TABLE OF CONTENTS

EXECUTIVE SUMMARY AND ANALYSIS

INTRODUCTION 1

GROWTH IN ONTARIO'S MANUFACTURING AND CONSTRUCTION SECTORS 3

OCCUPATIONAL SHORTAGES IN THE MANUFACTURING AND CONSTRUCTION SECTORS 10

SHORT-TERM OUTLOOK 18

NOTES 25

EXECUTIVE SUMMARY AND ANALYSIS

SUMMARY

This study provides a review of employment growth and an assessment of occupational shortages in two key sectors of Ontario's economy; namely, manufacturing and construction. Analysis of occupational shortages is restricted to high skill technical occupations that usually require one year or more of specialized vocational preparation but do not require completion of a formal university degree. For many of these jobs, persistent shortages of qualified workers will act as bottlenecks in the economy by imposing constraints on the expansion of production and employment levels. By monitoring the availability of skilled workers and employers' demands for them, current or emerging occupational shortages can be assessed to provide the basis for considering training initiatives to respond to labour shortages.

There are no precise and comprehensive data bases for analyzing occupational shortages and, thus, it has been necessary to assemble and interpret information from a variety of sources including:

- Community Industrial Training Committees' (CITC's) Labour Market Needs Surveys;
- Community Colleges' Labour Market Needs Assessments;

- Canada Employment and Immigration (CEIC) Authorizations to Employers to Recruit Offshore;
- CEIC's National Job Bank;
- Community College Graduate Placement Reports;
- CEIC's Active Unemployment Insurance Claimants File for Ontario;
- CEIC's Reports on Immigration into Ontario.

The main findings of this study are:

- In Ontario's manufacturing and construction sectors, real output and employment expanded rapidly between 1983 and 1986. Employment increased by 87,000 and 50,000 in manufacturing and construction respectively over this four year period.
- Manufacturing and construction industries are key employers of workers in high skill technical occupations. However, growth in output and employment varies across industries within these two sectors which implies that certain occupations and skills are in greater demand than others.
- A total of 98 occupations are identified where employers appear to be encountering difficulties in recruiting the skilled workers they require. These occupations are heavily concentrated in the following areas:
  - Tool and Die Making;
  - Machinist and Machine-Tool Set Up;
  - Welding;
  - Installation, Repair and Testing - Electrical, Electronic and Related Equipment;
  - Pattern Making and Moulding;

- Machinery and Instrument Mechanics and Repair;
- Construction Trades;
- Technologists;
- Computer Programming.

- Many employers are attempting to resolve their labour shortage problems by recruiting skilled workers from other countries. This solution to skilled labour shortages, however, has become more difficult to exercise since only small numbers of immigrants coming to Ontario list these high skill technical occupations as the jobs they intend to pursue upon settling in Ontario. Consequently, a heavier emphasis has to be given to training and retraining as fewer skilled immigrants join the labour force.

- When shortages of qualified workers to fill jobs in these high skill technical occupations arise, the shortages cannot be quickly and easily resolved. A considerable length of time is required to develop qualified workers for these occupations and in many cases the training involves a combination of formal classroom and on-the-job training.

- The outlook for Ontario's economy is for continuing economic expansion throughout 1987 and 1988 with continued growth in output and employment for Ontario's manufacturing and construction sectors. In light of this short-term outlook, strong demand for skilled workers and occupational shortages in these two important sectors will persist.

ANALYSIS

A critical factor contributing to Ontario's positive economic performance over the past four years has been the existence of a skilled work force to operate, maintain, repair and adapt production facilities and to undertake the design, engineering, construction and set-up of

new machinery, equipment and physical plant facilities. For sustained economic growth, it is vital to avoid shortages of skilled workers since persistent labour shortages will constrain growth in output and employment.

During recessions, the failure to train enough skilled workers is often hidden, but shortages become apparent when an economy moves into an extended phase of economic expansion. Shortages of skilled workers create bottlenecks in the economy and constrain production as employers find it difficult to hire the qualified workers they need to increase output in response to expanding market demands. On this point, the fact that labour shortages can impose real constraints on industrial expansion was well documented by Canada's Parliamentary Task Force on Employment Opportunities for the 1980's, and by the Automotive Industry Human Resources Task Force which found that employers' difficulties in recruiting adequate numbers of workers for high skill technical jobs led to losses in production.

Skills shortages are appearing in a number of industries where it is vital for Ontario to do well to sustain a high standard of living (businesses where high value-added and technologically more sophisticated products are made). Industries in this category that have experienced above average employment growth and where shortages of qualified workers to fill jobs in high skill occupations are beginning to appear include:

- motor vehicle parts and accessories manufacturers;
- motor vehicle manufacturers;
- communication equipment manufacturers;
- aircraft and aircraft parts manufacturers;
- fabricated structural metals and metal stamping and pressing;
- electrical products;
- building construction and special trade contractors.

An emphasis on long-term training to ensure an adequate supply of workers to fill high skilled jobs is a strategic investment for long-term economic growth and productivity improvement. By avoiding labour shortages that can create bottleneck situations, economic growth with a reduced risk of inflation can be attained and the economic welfare of members of the work force can be enhanced.

Long-term training and a well qualified work force are vital for the Ontario economy. This study will help guide the Ministry in identifying program priorities for skilled trades training and retraining in the manufacturing and construction sectors. The Ministry will also encourage the federal government to use the findings in developing their priorities.

INTRODUCTION

Ontario's economic performance has been very impressive over the past four years. Real gross domestic product has expanded at an average annual rate of 5.9 percent between 1983 and 1986, a rate of growth that surpasses overall economic growth in Canada and growth rates achieved by other major OECD industrial countries such as the United States, Japan, France, West Germany, Italy, Sweden and the United Kingdom.[1]

Paralleling this expansion in the economy, total employment in Ontario rose at an average annual rate of 3.6 percent between 1983 and 1986. During this period, an average of 153,000 jobs have been created annually, the majority of these (88.5 percent) are full-time jobs. As well, employment growth has outpaced growth in the labour force over this period, resulting in a substantial decline in the overall unemployment rate from 10.4 to 7.0 percent between 1983 and 1986.

A critical factor underlying Ontario's positive economic performance in recent years has been the availability of a skilled work force to operate, maintain, repair and adapt production facilities and to undertake the design, engineering, construction and set-up of new machinery, equipment and physical plant facilities. As well, for economic expansion to continue it is important that the supply of skilled workers be sufficient to facilitate growth. Persistent labour shortages for high skill occupations can constrain economic growth

and overall expansion in employment since employers will be unable to hire the qualified workers they require to increase productive capacity in response to expanding market demands. Consequently, it is important to be able to identify occupational shortages by monitoring employers' demands for workers to fill skilled jobs and the availability of workers to meet these demands to provide the basis for training initiatives which can respond to occupational needs.

The emphasis in this paper is on reviewing the demand for labour in two key sectors of Ontario's economy - manufacturing and construction - and on identifying occupations where the available evidence indicates the existence of shortage situations in these sectors. Before turning to this task, a brief overview of recent employment trends in Ontario's manufacturing and construction industries is presented to provide a context in which to assess occupational shortages in these industries.

GROWTH IN ONTARIO'S MANUFACTURING AND CONSTRUCTION SECTORS

Both real output and employment expanded rapidly in Ontario's manufacturing and construction sectors between 1983 and 1986 (see Table 1). Real output grew at an average annual rate of 5.8 percent in manufacturing and 11.1 percent in construction, while employment in these sectors increased at an average annual rate of 3.0 and 7.6 percent respectively. With respect to job creation, an average of 29,000 and 16,700 additional jobs were created annually in the manufacturing and construction sectors respectively between 1983 and 1986.

Within the manufacturing sector, employment growth has differed dramatically among industries. For instance, between 1983 and 1986, rates of growth in employment varied from a high of 13.7 percent per year in aircraft and aircraft parts manufacturers to a net decline of 11.6 percent per year in the agricultural implement industry.[2]

Those manufacturing industries which have shown relatively rapid employment growth over the 1983 to 1986 period are highlighted in Table 2. In selecting these industries a cut off of 3 percent or more in employment growth was used. There are twenty-seven industries in this high growth category which accounted for 35.7 percent of total manufacturing employment in 1986 and they have contributed a total of 42,245

T A B L E 1

GROWTH IN REAL OUTPUT[1] AND
EMPLOYMENT IN THE MANUFACTURING AND
CONSTRUCTION SECTORS, ONTARIO, 1983-86

	Average annual rate of growth in real output (%)	Net change in employment: 1983-86	Average annual rate of growth in employment (%)
Ontario	5.9	459,000	3.6
Manufacturing	5.8	87,000	3.0
Construction	11.1	50,000	7.6

[1]Note: Real output is measured by gross domestic product in real terms.

SOURCES: The Conference Board of Canada; Statistics Canada, The Labour Force, Cat. No. 71-001.

TABLE 2

MANUFACTURING INDUSTRIES WITH EMPLOYMENT GROWTH OF THREE PERCENT OR MORE, ONTARIO, 1983-86

Industry	Employment		Change in Employment	Average Annual Rate of Growth (%)
	1983	1986	1983-86	1983-86
Aircraft and aircraft parts manufacturers	11,545	16,900	5,355	13.7
Railroad rolling stock industry	3,178	4,314	1,136	11.2
Carpet, mat and rug industry	1,792	2,419	628	10.7
Sash, door and other millwork plants	7,943	9,716	1,773	7.5
Ready-mix concrete manufacturers	2,434	2,916	482	7.3
Manufacturers of soap and cleaning compounds	5,895	7,249	1,354	7.2
Hardware, tool and cutlery manufacturers	17,585	18,572	987	6.3
Publishing only	7,468	8,930	1,462	6.2
Flour and breakfast cereal products industry	2,961	3,534	573	6.1
Fabricated structural metal industry	3,803	4,503	700	5.8

continued...

TABLE 2 continued

Industry	Employment		Change in Employment	Average Annual Rate of Growth (%)
	1983	1986	1983-86	1983-86
Office furniture manufacturers	4,427	4,991	564	5.6
Glass and glass products manufacturers	6,786	7,905	1,119	5.5
Metal stamping, pressing and coating industry	23,719	26,847	3,128	5.3
Office and store machinery manufacturers	8,263	9,583	1,321	5.3
Manufacturers of miscellaneous electrical products	7,704	8,982	1,278	5.3
Paint and varnish manufacturers	3,717	4,294	577	4.9
Manufacturers of pharmaceuticals and medicines	9,786	11,275	1,490	4.9
Motor vehicle manufacturers	36,914	42,207	5,293	4.7
Motor vehicle parts and accessories manufacturers	53,095	60,309	7,214	4.4
Automobile fabric accessories industry	4,367	4,951	584	4.3
Manufacturers of household radio and television receivers	3,090	3,490	400	4.2
Women's clothing industries	7,994	8,401	407	4.0

continued...

TABLE 2 continued

Industry	Employment		Change in Employment	Average Annual Rate of Growth (%)
	1983	1986	1983-86	1983-86
Communications equipment manufacturers	26,052	29,024	2,972	3.9
Cement manufacturers	1,408	1,538	131	3.1
Men's clothing industries	10,654	11,486	832	3.1
Veneer and plywood mills	2,197	2,386	190	3.0
Metal rolling, casting and extruding, n.e.s.	3,435	3,730	295	3.0
Total	278,212	320,452	42,245	

Note: Estimates of employment for the months of January and February of 1983 were interpolated based on the data for large firms (with 20 or more employees).

SOURCE: Statistics Canada, Survey of Employment, Payroll and Hours.

additional jobs to Ontario's economy in the past four years[3].

The more important industries in terms of employment growth include:

- Motor vehicle parts and accessories manufacturers: This industry, the largest manufacturing industry in Ontario, employed 60,309 persons in 1986. Employment increased at an average annual rate of 4.4 percent for the 1983-86 period. A total of 7,214 additional jobs were created during this period.

- Motor vehicle manufacturers: This industry employed 42,207 persons in Ontario in 1986. Employment in this industry grew at an average annual rate of 4.7 percent during the 1983-86 period, representing a creation of 5,293 additional jobs.

- Communication equipment manufacturers: This industry employed 29,024 persons in Ontario in 1986. Employment in this industry expanded at an average annual rate of 3.9 percent over the 1983-86 period and a total of 2,972 additional jobs were created.

- Metal stamping, pressing and coating industry: This industry employed 26,847 persons in Ontario in 1986. Employment in this industry rose at an average annual rate of 5.3 percent between 1983 and 1986 and a total of 3,128 additional jobs were created.

- Aircraft and aircraft parts manufacturers: This industry employed 16,900 persons in Ontario in 1986. Employment in this industry expanded rapidly at an average annual rate of 13.7 percent between 1983 and 1986 and 5,355 additional jobs were created.

Turning to the construction sector, of the four specific industries for which data are available, three industries have shown relatively rapid employment growth over the 1983-86 period (see Table 3). These industries, namely, special trade contractors, building construction[4], and other engineering -- industrial and heavy

construction, accounted for 94.6 percent of total construction employment in 1986 and have been the source of 37,789 additional jobs between 1983 and 1986.

T A B L E 3

CONSTRUCTION INDUSTRIES WITH EMPLOYMENT GROWTH OF THREE PERCENT OR MORE, ONTARIO, 1983-86

Industry	Employment		Change in Employment	Average Annual Rate of Growth (%)
	1983	1986	1983-36	1983-86
Special-trade contractors	81,889	109,744	27,855	10.4
Building construction	26,607	34,762	8,155	9.4
Other engineering (industry and heavy construction)	14,935	16,714	1,779	4.1
Total	123,431	161,220	37,789	

Note: Estimates of employment for the months of January and February of 1983 were interpolated based on the data for large firms (with 20 or more employees).

SOURCE: Statistics Canada, Survey of Employment, Payroll and Hours.

OCCUPATIONAL SHORTAGES IN THE MANUFACTURING AND CONSTRUCTION SECTORS

In light of the strong growth in output and employment in recent years in Ontario's manufacturing and construction sectors, whether or not employers are beginning to encounter difficulties in recruiting workers to fill high skilled jobs is an important concern. Within the overall spectrum of jobs and occupations, the emphasis in this section is on reviewing high skilled technical occupations that are directly related to the maintenance and expansion of production and employment levels. These occupations usually require one year or more of specific vocational preparation to acquire the necessary information, techniques and skills but do not require completion of a formal university program.

For assessing occupational shortages, it is important to analyse both the supply of qualified workers and employers' demands for these workers. In an ideal world of perfect information, analysts would be armed with comprehensive information on both these dimensions. There are, however, no precise and comprehensive data bases available which one can utilize for this purpose. Rather, as will be demonstrated below, it is necessary to assemble information from a variety of sources and piece together data on occupational labour markets and to interpret and make inferences from these data before drawing conclusions on whether or not shortages exist for a specific occupational

category. The primary sources used in this review include:

- Community Industrial Training Committees' (CITC's) Labour Market Needs Surveys;
- Community Colleges' Labour Market Needs Assessments;
- Canada Employment and Immigration (CEIC) Authorizations to Employers to Recruit Offshore;
- CEIC's National Job Bank;
- Community College Graduate Placement Reports;
- CEIC's Active Unemployment Insurance Claimants File for Ontario.
- CEIC's Reports on Immigration into Ontario.

The first four sources listed above provide a basis for examining employers' requirements for additional workers and identifying occupational categories where employers may be encountering difficulties in recruiting employees. Each of these four sources and the time periods covered by the data from them are described in more detail below.

The surveys conducted by Community Industrial Training Committees (CITC's) are funded by the Ministry of Skills Development and focus on emloyers' demands for workers in specific occupations and industries.[5] While individual surveys are restricted to specific geographic areas of the Province, twenty-five reports from CITC's across the Province which cover a substantial part of the Province were examined for this review.[6] All of these twenty-five reports have a survey reference period either in 1986 or 1987.

Another source of information on occupational demand within different regions of the Province are the Community Colleges' labour market needs assessments. As part of the overall planning process to identify training

requirements for funding under the Canada - Ontario Training Agreement, each College submits an annual assessment to the Ministry of Skills Development on the labour market demand in the College's geographical area. The Colleges' labour market needs assessment reports submitted to the Ministry in 1986 are used in this review.

Data from CEIC on authorizations granted to employers to recruit workers offshore provide an insight into those occupations for which employers are experiencing difficulty in recruiting skilled workers in the domestic labour market. To qualify for an authorization, employers must demonstrate to CEIC that they have not been able to fill their vacant jobs from the available domestic labour supply. These employer authorization data were analyzed from the second quarter of 1984 through to the third quarter of 1986, the most recent quarter for which these data are available from CEIC.

The National Job Bank is another source of information on employers' demands for labour. Job orders submitted to local Canada Employment Centres (CEC's) by employers which remain unfilled for a period of two weeks are listed in the job bank inventory along with the geographic location of the job vacancy. The comprehensiveness of this inventory of job vacancies, of course, varies with the extent to which employers in different regions of the Province use th% employment exchange services of local CEC's. For this review of occupational shortages, National Job Bank reports have been examined for the period January, 1986 through to June, 1987.

Annual Reports from the Community Colleges on the placement rate of graduates, especially in jobs that are related to their programs of study, also reflect the state of the market for specific occupations. When very high proportions of graduates are finding jobs related to their program of study, one may conclude that labour demand in those related occupations is very strong. Data on the placement rates of graduates by program of study are available from 1980 to 1986.

With respect to the supply side of the market, statistics on active unemployment insurance claimants classified by the occupational category of their previous jobs are used to analyze the availability of workers to meet employers' demands for jobs in specific occupations. As well, for a number of construction trades a subset of these data were used to obtain an insight into the supply of workers available by occupation who are referred to jobs through union hiring halls. The analysis of active unemployment insurance claimants has been undertaken at two levels of aggregation and for two different time frames. First, for broad occupational categories statistics for the period 1983 to the second quarter of 1987 were examined, while for specific occupations within these categories data on active unemployment insurance were analyzed for the first and second quarters of 1987[7].

Statistics from CEIC on immigrants into Ontario by intended occupation were reviewed to assess the potential importance of this source of labour supply for meeting employers' requirements for skilled workers. These data on immigrants by intended occupation covered the time period 1984 to the second quarter of 1987.

Data from all of the above sources were assembled and analysed for occupations that are of primary importance in the manufacturing and construction sectors with an emphasis on high skill technical occupations. Before turning to the results of the analysis, it should be stressed that many of the statistics utilized in this review are derived from administrative records (e.g. unemployment insurance claimants by occupation) developed for the operation of programs rather than the production of precise labour market statistics. Consequently, it is necessary to exercise some caution in using data from these sources for analysing occupational labour markets.

Based on the work outlined above, a total of 98 occupations have been identified where employers appear to be encountering difficulties in recruiting the skilled workers they require.

These occupations, which are listed in Table 4 presented at the end of this report, are heavily concentrated in the following areas:

- Tool and Die Making;
- Machinist and Machine-Tool Set Up;
- Welding;
- Installation, Repair and Testing - Electrical, Electronic and Related Equipment;
- Pattern Making and Moulding;
- Machinery and Instrument Mechanics and Repair;
- Construction Trades;
- Technologists;
- Computer Programming.

For these occupational categories, there has been a substantial reduction in the number of experienced workers available to meet employers' additional demands and in many cases employers are endeavouring to resolve their skilled labour shortage problems by recruiting workers from other countries. With respect to the availability of workers, the numbers of persons on unemployment insurance whose previous jobs were in the above occupational groups declined markedly between 1983 and the second quarter of 1987. In addition, a review of authorizations received by employers to recruit skilled workers offshore reveals an increase in the frequency of these authorizations between 1984 and 1985 which continues on into the third quarter of 1986 (the most recent quarter for which these data are available), an indication that employers have begun to encounter difficulties in recruiting the skilled workers they require in the domestic labour market.

This is certainly the situation for occupations such as tool and die maker, mould maker, machinist, millwright, machine builder and industrial mechanic. As well, data from the

National Job Bank and CITC surveys for 1986 and 1987 provide additional evidence that employers have job openings in these occupations and are encountering recruitment difficulties. For occupations that involve the installation, repair and testing of electrical and electronic and related equipment, the same patterns exist.

For specialized occupations such as plastics-moulding-machine setter and extruding machine operator, National Job Bank data and CITC surveys indicate that employers require additional workers and are encountering recruiting difficulties. While few employers were seeking authorizations as of the third quarter of 1986 to recruit workers offshore for jobs in these specialized occupations, data on unemployment insurance claimants by occupation for the first and second quarters of 1987 show that there are relatively few unemployed workers in Ontario who have previous work experience in these occupations.

With respect to the construction industry trades, a review of the National Job Bank data and CITC survey reports during 1986 and 1987 indicate that jobs are available for electricians, refrigeration and air conditioning machanics, plumbers, carpenters and bricklayers. However, the number of qualified workers available in Ontario to take these jobs, as measured by the number of tradesmen available through union hiring halls in the second quarter of 1987 is quite low. As of the third quarter of 1986, however, only a small number of employers were requesting authorizations to recruit construction tradesmen offshore, a situation that is probably partly attributable to the qualifications required in many of these trades, whereby, a worker must have a Certificate of Qualification to work in the trade.

In regards to technologists and technicians in architecture, electronic engineering, industrial engineering and mechanical engineering, employers' requests for persons qualified to work in these occupations have been appearing regularly in the National Job Bank in 1986 and the first half of 1987 and very high proportions (88 percent or more) of Community College graduates in programs associated with

these occupations found employment within three months of completing their programs of study in 1986. In addition, during the first three quarters of 1986 many employers received authorizations from CEIC to recruit technicians and technologists from other countries to fill jobs in these occupations.

Computer programmers for engineering, scientific and business applications are also in demand. Again, persons graduating in 1986 from Community College programs in the area of computer technology are well positioned to compete for jobs as evidenced by the high proportions of these graduates who find employment. Also, during 1985 and the first three quarters of 1986 a substantial number of employers were seeking qualified workers offshore for jobs in these occupations to resolve their recruitment problems.

For many of the high skilled technical occupations identified in Table 4, the availability of qualified workers to meet employers' requirements plays a key role in the maintenance and expansion of output and employment. For example, based on the 1981 Census data (the most recent detailed data available on employment by occupation and industry) 63.3 per cent of all employed tool and die makers in Ontario had jobs in the twenty-seven high growth manufacturing industries identified in the previous section, even though tool and die makers accounted for only 0.1 percent of total employment in Ontario and 2 percent of total employment in these twenty-seven industries. Similarly, these industries accounted for significant proportions of all persons employed in Ontario in such occupations as patternmaker and mouldmaker, sheet metal, metal machining, and machinist and machine tool set-up (42.4, 40.3, 34.2 and 27.4 per cent respectively). Again, although the twenty-seven industries are major employers of workers in these occupations, workers in these four occupational groups accounted for 2 per cent or less of total employment across these industries.

With respect to the high growth construction industries reviewed in the earlier section, in

1981 they employed very high proportions of Ontario's skilled workers in the following trades: carpenters (70.3 per cent), brick and stone masons and tile setters (76.5 per cent), construction electrician and repair (56.5 per cent). Within the construction industries, however, workers in these trades constituted much lower proportions of total employment, ranging from a high of 10 per cent for carpenters to approximately 3 per cent for brick and stone masons and tile setters.

Given the importance of the expanding manufacturing and construction industries as employers of workers in high skill technical occupations and the pivotal role of these workers within the industries, persistent shortages of qualified workers in these occupations will act as bottlenecks and impose constraints on economic growth as employers will be unable to recruit the skilled workers they need to increase productive capacity in response to growth in market demands. On this point, evidence that labour shortages can impose real constraints on industrial expansion and employment growth was presented to the Parliamentary Task Force on Employment Opportunities for the 1980's.[8] As well, the Automotive Industry Human Resources Task Force pointed out that many employers in the automotive parts industry were experiencing difficulties in hiring adequate numbers of workers for jobs in the high skill technical occupations which led to losses in production that could not be recouped at a later date.[9]

As noted earlier, in efforts to resolve their recruitment problems more employers began to obtain authorization from CEIC in 1985 and 1986 to recruit skilled workers offshore. This solution to skilled labour shortages, however, has become more difficult to exercise. Over the period 1984 to the second quarter of 1987, generally there were small numbers of immigrants coming into Ontario reporting the occupations listed in Table 4 as their intended occupation. In part, this reflects the increasing standards of living and buoyant economic conditions in those countries from which Canada has drawn many of its skilled workers in the past.

SHORT-TERM OUTLOOK

The outlook for Ontario's economy is for continuing economic growth throughout 1987 and into 1988. It is estimated that Ontario's economy, as measured by growth in real gross provincial product, will expand by 3.5 percent in 1987 and major contributors to this increase in output will be investment in machinery and equipment, non-residential construction and residential construction.[10] For 1988, both the Conference Board of Canada and Informetrica Limited predict continued growth in output and employment for Ontario's manufacturing and construction sectors.

In light of the short-term outlook, strong demand for skilled workers and occupational shortages in the manufacturing and construction industries will persist. There are, however, no quick and easy solutions to resolving shortages of qualified workers to fill jobs in high skilled occupations. To develop qualified workers in occupations such as tool and die maker, mould maker, machinist and machine-tool setter, industrial machinery mechanics, and installers and repairers of electrical and electronic equipment requires a considerable length of time and usually involves a combination of formal classroom and on-the-job training. In contrast, the training of skilled workers tends to have a very short-term focus which is directly related to swings in production requirements. For many employers, training becomes an issue only when shortages of skilled workers have already surfaced in the labour market and employers are

encountering difficulties in recruiting the workers they require.[11] To avoid shortages of skilled workers that can impose constraints on Ontario's economic growth, there is a real need for a longer-term view on the level of industrial training.

T A B L E 4

SHORTAGE OCCUPATIONS IN ONTARIO'S MANUFACTURING AND CONSTRUCTION SECTORS, 1987

TOOL-AND-DIE MAKING OCCUPATIONS:

- tool and die maker
- mould maker
- die maker, bench, stamping
- die sinker, bench

MACHINIST AND MACHINE-TOOL SETTING UP OCCUPATIONS:

- patternmaker, metal
- machinist, model maker
- grinder set-up operator,jig
- machine-tool setter
- machine-tool set-up operator
- machinist, automotive
- machinist, general
- maintenance, machinist
- gear-cutting machine set-up operator
- boring mill set-up operator, horizontal
- engine-lathe set-up operator
- grinder set-up operator, precision
- grinder set-up operator, thread
- milling-machine set-up operator
- tape-control-machine-tool set-up operator
- tool grinder
- screw-machine set-up operator

FORGING OCCUPATIONS:

- die setter

SHEET-METAL WORKERS:

- sheet-metal worker

WELDING AND FLAME CUTTING OCCUPATIONS:

- welder-fitter
- welder, pressure vessels
- welder, combination

continued...

TABLE 4 continued

- welder, arc
- welding technician

WOOD PATTERNMAKING OCCUPATIONS:

- patternmaker, wood

ABRADING AND POLISHING OCCUPATIONS: CLAY, GLASS, STONE AND RELATED MATERIALS:

- surface-plate finisher

PATTERNMAKERS AND MOULDMAKERS, NEC:

- model maker
- patternmaker, metal
- patternmaker, plaster
- jig and form maker

INDUSTRIAL, FARM, CONSTRUCTION AND OTHER MECHANIZED EQUIPMENT AND MACHINERY FABRICATING AND ASSEMBLING OCCUPATIONS, NEC:

- machine builder

ELECTRICAL AND RELATED EQUIPMENT, INSTALLING AND REPAIRING OCCUPATIONS, NEC:

- electrical repairman
- electrician, automotive
- refrigeration mechanic
- repairman, electric motor
- repairman, major appliance
- repairman, electrical instruments

ELECTRONIC AND RELATED EQUIPMENT INSTALLING AND REPAIRING OCCUPATIONS, NEC:

- repairman, electronic-equipment
- repairman, automated processing equipment

INSPECTING AND TESTING OCCUPATIONS: FABRICATING, ASSEMBLING, INSTALLING AND REPAIRING, ELECTRICAL, ELECTRONIC AND RELATED EQUIPMENT:

- tester, control-panel
- tester, systems
- tester, electronic components

continued...

TABLE 4 continued

CABINET AND WOOD FURNITURE MAKERS:

- cabinetmaker

FABRICATING, ASSEMBLING AND REPAIRING OCCUPATIONS, WOOD PRODUCTS, NEC:

- wood carver

PATTERNMAKING, MARKING AND CUTTING OCCUPATIONS: TEXTILE, FUR AND LEATHER PRODUCTS:

- patternmaker

UPHOLSTERERS:

- upholsterer, all around

MOULDING OCCUPATIONS, RUBBER, PLASTIC AND RELATED PRODUCTS:

- plastics-moulding-machine setter
- extruding-machine operator

MOTOR-VEHICLE MECHANICS AND REPAIRMEN:

- motor-vehicle mechanic
- industrial-truck mechanic
- body repairman

AIRCRAFT MECHANICS AND REPAIRMEN:

- aircraft mechanic

INDUSTRIAL, FARM AND CONSTRUCTION MACHINERY MECHANICS AND REPAIRMEN:

- printing-machinery mechanic
- heavy-duty-equipment mechanic
- millwright
- diesel mechanic

BUSINESS AND COMMERCIAL MACHINE MECHANICS AND REPAIRMEN:

- office-machine serviceman

PRECISION INSTRUMENT MECHANICS AND REPAIRMEN:

- instrument repairman

continued...

TABLE 4 continued

OTHER MECHANICS AND REPAIRMEN, NEC:

- field serviceman

MOULDING, COREMAKING AND METAL CASTING:

- pattern moulder

BAKING, CONFECTIONARY MAKING AND RELATED OCCUPATIONS:

- baker

KNITTING OCCUPATIONS:

- knitting machine fixer

EXCAVATING, GRADING AND RELATED OCCUPATIONS:

- heavy-equipment operator

CONSTRUCTION ELECTRICIANS AND REPAIRMEN:

- refrigeration and air-conditioning mechanic
- electrician

WIRE COMMUNICATIONS AND RELATED EQUIPMENT INSTALLING AND REPAIRING OCCUPATIONS:

- central-office-equipment repairman
- communications electrician

INSPECTING AND TESTING OCCUPATIONS: ELECTRICAL POWER, LIGHTING AND WIRE COMMUNICATIONS EQUIPMENT ERECTING, INSTALLING AND REPAIRING:

- electrical-testing technician

CARPENTERS AND RELATED OCCUPATIONS:

- carpenter

BRICK AND STONE MASONS AND TILE SETTERS:

- bricklayer

PIPEFITTING, PLUMBING AND RELATED OCCUPATIONS, NEC:

- plumber

continued...

TABLE 4 continued

OTHER CONSTRUCTION TRADES OCCUPATIONS, NEC:

- maintenance mechanic, factory or mill

DRAUGHTSMEN:

- computer-assisted design draughtsperson
- mould designer

ARCHITECTURAL AND ENGINEERING TECHNOLOGISTS AND TECHNICIANS:

- architectural technologist
- chemical-engineering technologist
- electrical-engineering technologist
- electronic-engineering technologist
- industrial-engineering technologist
- mechanical-engineering technologist
- metallurgical-engineering technologist
- civil-engineering technician
- electrical-engineering technician
- electronic-engineering technician
- industrial-engineering technician
- mechanical-engineering technician
- robotics-engineering technician

SYSTEMS ANALYSTS, COMPUTER PROGRAMMERS AND RELATED OCCUPATIONS:

- systems-software programmer
- programmer, business
- programmer, engineering and scientific
- application programmer
- numerical control tool programmer
- computer graphics specialist
- computer hardware specialist

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NOTES

1 For Canada and other OECD countries, average annual rates of growth in real gross domestic product between 1983 and 1986 are: Canada (4.2 percent), United States (4.1 percent), Japan (3.9 percent), France (1.5 percent), West Germany (2.7 percent), Italy (2.6 percent), Sweden (2.8 percent), United Kingdom (2.7 percent). The sources of these data are OECD, Main Economic Indicators, and the Conference Board of Canada.

2 To examine the contribution of individual industries to the total employment growth in the manufacturing and construction sectors, data from Statistics Canada's monthly Survey of Employment, Payroll and Hours (SEPH) were utilized. SEPH provides estimates of employment by detailed (three-digit SIC) industry. SEPH is an establishment survey which covers firms of all sizes as of March 1983. It excludes working owners and partners of unincorporated businesses. In terms of industry coverage, SEPH does not include agriculture, fishing and trapping, religious organizations and private households.

3 Of the 67 specific manufacturing industries for which data are available from SEPH, 41 industries experienced a positive gain in employment, while a decline in employment was recorded for 26 industries.

4 Building construction includes general contractors primarily engaged in the construction of buildings including houses, farm buildings,

public buildings, industrial and commercial buildings; or in building alterations and repairs, while special trade contractors perform only part of the work covered by a contract taken by a general contractor. Special trade contractors include those engaged in bricklaying, carpentry, cement work, electrical work, lathing, plastering, stucco work, painting, decorating, plumbing, heating, air conditioning installations, roofing, sheet metal work, tiling.

5 The CITC's are community based committees of employer and labour representatives established to advise the Ministry of Skills Development on training issues and programs and through employer surveys to provide information on the labour market needs of their communities. The Ministry of Skills Development provides funding to these Committees to cover their administrative costs and the costs of conducting labour market needs surveys.

6 These twenty-five reports cover the following geographic areas: Metropolitan Toronto and York Region, Hamilton-Wentworth, Brant, London, Windsor, Niagara, Simcoe, Kingston, Ottawa-Carleton, Renfrew, Sault Ste. Marie, Grey-Bruce, Thunder Bay, Fort Frances.

7 Within the Canadian Classification and Dictionary of Occupations, statistics on active unemployment insurance claimants were examined between 1983 and the second quarter of 1987 at the 4-digit level in the classification system and at the 7-digit level for the first and second quarters of 1987.

8 House of Commons, Work for Tomorrow - Employment Opportunities for the '80's, Parliamentary Task Force on Employment Opportunities for the '80's.

9 Report of the Automotive Industry Human Resources Task Force, Canada Employment and Immigration Commission, 1986.

10 Ontario Budget, 1987, (Budget Paper B: Economic Outlook), Ministry of Treasury and Economics.

11 For an analysis of training in industry in Ontario see: Training in Industry: A Survey of Employer Sponsored Programs in Ontario, April 1986, Ontario Manpower Commission, Ministry of Skills Development.